

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated December 15, 2003. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 4-8 are under consideration in this application. Claims 4-7 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicants' invention. A new claim 8 is being added to recited another embodiment described in the specification.

Additional Amendments

Claims 4-7 and the Abstract are being amended to correct formal errors and/or to better recite or describe the features of the present invention as claimed. All the amendments to the claims are supported by the specification. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formality Rejection

The Abstract of the Disclosure was objected to on informal grounds, and has required correction thereof. Claim 7 was rejected under 35 U.S.C. § 112, second paragraph, on the grounds of being vague and indefinite. As indicated, the specification and the claims have been amended as required by the Examiner. Accordingly, the withdrawal of the outstanding informality rejection is in order, and is therefore respectfully solicited.

Prior Art Rejection

Claims 4 - 6 were rejected under 35 U.S.C. 102(e) on the grounds of being anticipated by U.S. Pat. No. 6,362,004 to Noblett (hereinafter "Noblett"). Claims 4 - 7 were then rejected under 35 U.S.C. 102(e) on the grounds of being anticipated by U.S. Pat. No. 6,188,783 to Balaban et al. (hereinafter "Balaban"), and by U.S. Pat. No. 6,349,144 to Shams (hereinafter "Shams"). The references to Wolber (USP 6,284,465) and Maslyn et al. (USP 6,408,308) were

cited as pertinent. These rejections have been carefully considered, but are most respectfully traversed, as more fully discussed below.

The method for indexing a microarray chip 10 (e.g., Fig. 1B) with a plurality of spots 15 arranged in a predetermined positional relationship thereon of the invention, comprises: selecting some of the plurality of spots as index spots 17 (p. 4, lines 15-16); spotting (“*the element spotted on the location*” claim 7 as originally filed, line 10) at least one biological element (e.g., “*elements (probes)*” p.1, lines 14-15; “*DNA immobilized on the chip*” p. 2, line 18; “*gene/protein... gene/amino acid sequence*” p. 12, line 5; “*molecular biology*” p. 1, line 10) onto one of remaining spots as a non-index spot (inferred from Figs. 2-5); and **indexing** (e.g., in binary codes; “*the index information is reproduced by detecting the presence or absence of a detective colorant on the index spots*” last sentence of claim 5 as originally filed) **the microarray chip spotted with said on-chip-element by selectively providing** (p. 9, line 20) **at least one kind of detective colorant onto the index spots based upon index information** which includes a type of said on-chip-element (e.g., “*types of elements (probes)*” p.1, lines 14-15, 23-24; “*types of the DNA immobilized on the chip*” p. 2, line 18) and a corresponding location of said non-index spot on the chip (“*element immobilized one location on the chip*” p. 2, lines 4-5); and **(Claim 4) automatically** (p. 3, line 15) **identifying** (“*indexing the microarray chip for identification*” p. 1, lines 7-8; “*the chip be identified*” p. 2, line 19) **the microarray chip by detecting said detective colorant provided on said index spots**, or **(Claim 5)** reproducing the index information is reproduced by detecting the presence or absence of said detective colorant provided on the index spots thereby automatically identifying the microarray chip.

In claim 6, the index spots are arranged in a two-dimensional matrix (Fig. 3) including some of the index spots 26 designated as parity spots 27 and provided with said detective colorant based upon a parity algorithm running by row and by column of the matrix (p. 9, last paragraph). Upon reproducing the index information, the parity spots 27 are checked for errors (“*for detecting any error of any [index] spot at a particular position*” p. 9, lines 14).

Claim 7 (Fig. 6) further recites the steps of: constructing a database for storing an element information record 63, a microarray chip master record 61, and an on-chip-element information record 62; recording information of said element on the element information record with an element index 66 (i_elmid); recording information of the microarray chip 10 on the microarray chip master record 61 with a microarray index 64 (r_aryid); recording, on the on-chip-element information record 62, information of the microarray index 64, said corresponding location of

said non-index spot on the microarray chip 10, said element index 66 of said element spotted on said corresponding location, and information of experiment conducted ("*information of the microarray chip experiment*" p. 12, line 23; p.13, lines 17-18) and measurement taken in said non-index spot ("*measurement information*" Fig. 6); linking the microarray chip 10 with the microarray chip master record 61 as well as the on-chip-element information record via the microarray index 64, 65 coded in the index spots; and linking the on-chip-element information record 62 with the element information record 63 via the element index 66.

The plurality of spots of microarray chip can be arranged in a two-dimensional matrix, while the index spots are selected as (1) one row or one column of the matrix (Fig. 4B); (2) as two rows or two columns of the matrix (Figs. 4C-D); or (3) as three sections on each of three rows or columns of the matrix (Fig. 4A). Other embodiments are shown in Fig. 5.

In other words, the invention codes the index information in the index spots by providing detective colorant thereon thereby automatically identifying the microarray chip spotted the particular biological elements without printed letters, numbers, symbols or barcodes on the chip (p. 2, last two paragraphs).

Applicant respectfully submits that none of the cited prior art references discloses, teaches or suggests such a step of "indexing the microarray chip spotted with said on-chip-element by selectively providing at least one kind of detective colorant onto the index spots based upon index information which includes a type of said on-chip-element and a corresponding location of said non-index spot on the chip" and a step of "automatically identifying the microarray chip by detecting said detective colorant provided in said index spots" according to the invention.

In contrast, Noblett reference merely uses fiducial marks for maintaining position information thereby precisely depositing the microarray in a predetermined position. Noblett does not index/spotting the index spots with a detective colorant thereon to automatically identify the microarray chip based upon the "index information" binarily-coded in the index spots according to the present invention.

Balaban only stores the alleged index information (representing the relationship between the probe records and the sequence records) on a database. At most, Balaban identifies the chip by the alleged index information directly which is usually lengthy and cumbersome, rather than any coded index information contained in the detective colorant in the index spots. Therefore, Balaban falls short of teachings of "indexing/spotting the index spots with a detective colorant

thereon to automatically identify the microarray chip based upon the "index information" binarily-coded in the index spots according to the present invention

Shams uses grid points (including position information) to adjust the DNA spot images, but fails to "index/spot the index spots with a detective colorant thereon to automatically identify the microarray chip based upon the "index information" binarily-coded in the index spots according to the present invention

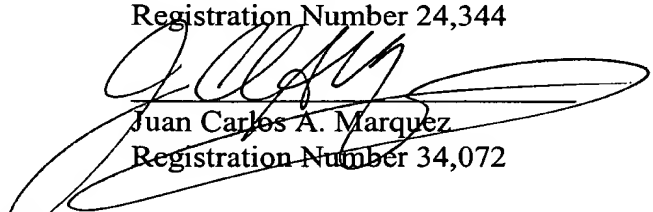
Applicants contend that the cited prior art references fail to teach or disclose each and every feature of the present invention as disclosed in independent claims 4 and 5. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicant respectfully contends that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and phone number indicated below.

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March 15, 2004
SPF/JCM/JT